WHAT IS CLAIMED IS:

1. Apparatus for using information about the extent of errors comprising

a first transducer positioned for sensing predetermined storage locations and generating a first signal representative of data containing at least one constraint from said predetermined storage locations and any errors introduced into the sensed data during said sensing;

an input device responsive to said first signal for generating a control signal containing information about the extent of errors in the sensed data and for extracting a data signal; and

an output device operatively coupled to the input device for receiving said control signal and for performing a control function in response thereto to improve the extracted data signal as a function of the extent of errors in the sensed data.

2. The apparatus of claim 1 wherein said output device is responsive to said control signal to produce a dynamic servo signal to improve alignment of the first transducer relative to predetermined storage locations.

3. The apparatus of claim 2 wherein the a dynamic servo signal is in the form of a substantially continuous servo signal to improve alignment of the first transducer relative to said predetermined storage locations.

4. Apparatus of Claim 2 wherein information about the extent of errors is developed from PRML processing of said first signal.

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5. The apparatus of claim 1 further comprising a second transducer positioned relative to said first transducer for sensing said predetermined storage locations and generating a second signal representative of data containing at least one constraint from said predetermined storage locations and any errors introduced into the sensed data during said sensing and wherein said input device generates said control signal from at least one of said first signal and said second signal and extracts a first data signal and a second data signal and wherein said output device is responsive to said control signal and at least one of said first data signal and said second data signal to derive therefrom a data signal containing the least amount of errors.

6. The apparatus of claim 1 wherein said first transducer includes

at least two sensors for concurrently sensing said predetermined storage locations and generating a first signal and a second signal each representative of the data containing said at least one constraint from said predetermined storage locations and any errors introduced into the sensed data during said sensing and wherein said input device generates said control signal from one of said first signal and said second signal and extracts a first data signal and a second data signal and wherein said output device is responsive to said control signal and at least one of said first data signal and said second data signal to derive therefrom a data signal containing the least amount of errors.

7. The apparatus of claim 6 wherein said output device is responsive to said control signal to shift the operating characteristics of at least one of said at least two sensors in said first transducer so as to reduce the extent of errors in at least one of said first signal and said second signal.

8. The apparatus of claim 6 wherein said output device is responsive to said control signal to produce a dynamic servo signal to improve alignment of said first transducer having said at least two sensor, with said predetermined storage locations concurrently with the derivation of a data signal containing the least amount of errors.

9. The apparatus of claim 2 wherein said output device includes

an adjusting element for receiving and responding to a said dynamic servo signal for adjusting said first transducer in a direction to improve said first transducer alignment relative to said predetermined storage locations.

10. The apparatus of claim 5 wherein said output device includes

an adjusting element for receiving and responding to a said dynamic servo signal for adjusting at least one of said first transducer and said second transducer in a direction to improve at least one of said first transducer and said second transducer alignment relative to said predetermined storage locations.

11. The apparatus of claim 6 wherein said at least two sensors are supported in a fixed, spaced relationship to each other.

12. The apparatus of claim 11 wherein said at least two sensors are each a magnetoresistive elements.

13. The apparatus of claim 6 wherein said at least two sensors are each a magnetoresistive element having an responsive shield therebetween which is responsive to an adjusting signal to shift the magnetic operating characteristics of one of the magnetoresistive elements.

14. The apparatus of claim 13 wherein the output device is responsive to said control signal to generate an adjusting signal for shifting the magnetic operating characteristics of one of the magnetoresistive elements in a direction to reduce the extent of errors contained in said first signal and said second signal.

15. The apparatus of claim 1 wherein said first transducer is responsive to said predetermined storage locations to generate a first signal having a data signal portion and an error signal portion and wherein said error signal portion is used to generate said control signal.

16. The apparatus of claim 1 wherein said predetermined storage locations are located in a storage medium, and wherein said first transducer is positioned relative to said storage medium for sensing data stored in said predetermined storage locations.

17. The apparatus of claim 16 wherein the first transducer and said storage medium are transported relative to each other and said control signal represents the difference between the current alignment from the desired alignment of the first transducer relative to said predetermined storage locations in said storage medium.

18. The apparatus of claim 17 wherein the adjusting element is responsive to said control signal for adjusting said first transducer in a direction to position said first transducer in improved alignment relative to said predetermined storage locations in said storage media.

19. The apparatus of claim 1 wherein the first transducer includes a magnetoresistive element, the predetermined storage locations is a track having a center line and the adjusting element is controlled to position said magnetoresistive element at a slight offset from the center line of the track in a known direction establishing a predetermined sensor offset, said output device being responsive to said control signal containing information about the extent of errors to generate a position error signal biased by said predetermined sensor position representing the magnitude and direction in which the adjusting element is to move said first transducer to improve magnetoresistive element alignment relative to said track.

20. The apparatus of claim 19 wherein said slight offset is to the left of the center line.

21. The apparatus of claim 19 wherein said slight offset is to the right of the center line.

22. The apparatus of claim 1 wherein said at least one constraint includes partial response maximum processing (PRML) encoding and wherein said control signal containing information about the extent of errors is derived during said PRML encoding of said first signal from observed samplings of said first signal and expected values of said observed samples as determined after maximum likelihood processing.

23. A method for using information about the extent of errors comprising the steps of

positioning a first transducer for sensing predetermined storage locations having stored data containing at least one constraint and generating a first signal representative of the data containing at least one constraint from said predetermined storage locations and any errors introduced into the sensed data during said sensing;

generating in response to said first signal a control signal containing information about the extent of errors in said sensed data and extracting a data signal; and

receiving said control signal and performing in response thereto a control function to improve the extracted data signal as a function of the extent of errors.

24. The method of Claim 23 when the step of generating includes developing said control signal containing information about the extent of errors from PRML processing of said first signal.

25. The method of claim 23 wherein the step of generating further includes producing a dynamic servo signal to improve alignment of the first transducer relative to said predetermined storage locations.

26. The method of claim 23 wherein the step of receiving further includes producing a dynamic servo signal in the form of a substantially continuous servo signal to improve alignment of the first transducer relative to said predetermined storage locations.

27. The method of claim 23 wherein the step of positioning further includes positioning a first transducer having at least two sensors for concurrently sensing said predetermined storage locations and generating a first signal and a second signal each representative of the stored data containing at least one constraint from said predetermined storage locations and any errors introduced into the sensed data during said sensing and wherein the step of generating includes generating said control signal from at least one of said first signal and said second signal and extracting a first data signal and a second data signal and the step of receiving is responsive to said control signal and at least one of said first data signal and said second data signal to derive therefrom a data signal containing the least amount of errors.

28. The method of claim 27 wherein the step of receiving further includes producing dynamic servo signal to improve alignment of said first transducer having said at least two sensors relative to predetermined storage locations concurrently with the extracting of a first data signal and a second data signal and the step of receiving is responsive to said control signal and at least one of said first data signal and said second data signal to derive therefrom a data signal containing the least amount of errors.

29. The method of claim 27 wherein the step of receiving is responsive to said control signal to generate an adjusting signal for shifting the operating characteristics of at least one of said at least two sensors in said first transducer so as to reduce the extent of errors in at least one of said first signal and said second signal.

30. The method of claim 27 wherein the step of receiving is responsive to said control signal to produce a dynamic servo signal in the form of a substantially continuous servo signal.

31. The method of claim 30 wherein the step of receiving includes adjusting said first transducer having said at least two sensors with an adjusting element responsive to information about the extent of errors in said control signal in a direction to improve said first transducer alignment relative to said predetermined storage locations.

32. The method of claim 30 wherein the step of receiving includes adjusting said first transducer having said at least two sensors with an adjusting element responsive to information about the extent of errors in said control signal and in a direction to improve alignment of said first transducer relative to said predetermined storage locations concurrently with the deriving of the data signal containing the least amount of errors from one of said at least two sensors.

33. The method of claim 23 wherein the step of positioning includes said predetermined storage locations having stored data containing as said at least one constraint wherein said at least one constraint includes partial response maximum processing (PRML) encoding and wherein said control signal containing information about the extent of errors is derived during said PRML encoding of said first signal from observed samplings of said first signal and expected values of said observed samples as determined after maximum likelihood processing.

34. The method of claim 23 wherein the step of positioning includes

positioning a first transducer and a second transducer for sensing predetermined storage locations having stored data containing at least one constraint and generating a first signal and a second signal each representative of the data containing at least one constraint from said predetermined storage locations and any errors introduced into the sensed data during said sensing and wherein the step of generating includes generating said control signal from at least one of said first signal and said second signal and extracting a first data signal and a second data signal and the step of receiving is responsive to said control signal and at least one of said first data signal and said second data signal to derive therefrom a data signal containing the least amount of errors.

35. The method of claim 34 wherein the step of generating further includes producing a dynamic servo signal to improve alignment of at least one of said first transducer and said second transducer relative to said predetermined storage locations.

36. The method of claim 34 wherein the step of receiving further includes producing a dynamic servo signal in the form of a substantially continuous servo signal to improve alignment of at least one of said first transducer and said second transducer relative to predetermined storage locations.

37. The method of claim 34 wherein the step of receiving further includes producing a dynamic servo signal to improve alignment of at least one of said first transducer and said second transducer relative to predetermined storage locations concurrently with the extracting of a first data signal and a

second data signal and the step of receiving is responsive to said control signal and at least one of said first data signal and said second data signal to derive therefrom a data signal containing the least amount of errors.

38. The method of claim 37 wherein the step of receiving is responsive to said control signal to produce a dynamic servo signal in the form of a substantially continuous servo signal.

39. The method of claim 38 wherein the step of receiving includes adjusting at least one of said first transducer and said second transducer with an adjusting element responsive to information about the extent of errors in said control signal in a direction to improve at least one of said first transducer and said second transducer alignment relative to said predetermined storage locations concurrently with the extracting of a first data signal and a second data signal and the step of receiving is responsive to said control signal and at least one of said first data signal and said second data signal to derive therefrom a data signal containing the least amount of errors.

40. The method of claim 34 wherein the step of positioning includes said predetermined storage locations having stored data containing as said at least one constraint wherein said at least one constraint includes partial response maximum processing (PRML) encoding and wherein said control signal containing information about the extent of errors is derived during said PRML encoding of said first signal from observed samplings of said first signal and expected values of said observed samples as determined after maximum likelihood processing.

41. A method for adjusting the position of a transducer having at least one read element and write element relative to a track containing data being sensed by the read element comprising the steps of

positioning the read element for sensing said track and generating a first signal representative of stored data containing at least one constraint from said predetermined storage locations and any errors introduced into the sensed data during said sensing;

generating with an input device in response to said first signal a control signal containing information about the extent of errors in said sensed data and extracting a data signal; and

receiving with an output device said control signal and performing in response thereto a control function of adjusting said transducer with an adjusting element in response to information about the extent of errors in said control signal in a direction to position said at least one read element to improve alignment of read element relative to said track.

42. The method of claim 41 wherein said adjusting means adjusts the position of said transducer while the write element is writing data containing the at least one constraint on a track.

43. A method for using information about the extent of errors in a storage system comprising the steps of

positioning a transducer for sensing data from predetermined storage locations in a storage system having stored data containing at least one constraint;

producing from said transducer a first signal representative of the sensed data containing said at least one constraint from said predetermined storage locations and any information about errors introduced into the sensed data during sensing in said storage system;

generating with an input device responsive to said first signal a control signal containing information about the extent of errors in said sensed data;

extracting from said first signal a data signal; and

receiving with an output device said control signal for performing a control function in response thereto to improve the extracted data stored in said predetermined storage locations in a storage system as a function of the extent of errors in the sensed data.

44. The method of claim 43 wherein the step of generating further includes producing a dynamic servo signal to improve alignment of the first transducer relative to said predetermined storage locations in said storage system.

45. The method of claim 43 wherein the step of receiving further includes producing a dynamic servo signal in the form of a substantially continuous servo signal to improve alignment of the first transducer relative to predetermined storage locations in said storage system.

46. The method of claim 43 wherein the step of receiving includes said output device having an adjusting element operatively coupled to said detector for receiving and responding to information about the extent of errors in said control signal for adjusting said transducer in a direction to improve said transducer alignment relative to said predetermined storage locations.

47. The method of claim 43 wherein the step of positioning further includes positioning a first transducer having at least two sensors for concurrently sensing said predetermined storage locations and generating a first signal and a second signal each representative of the data containing at least one constraint from said predetermined storage locations and any errors introduced into the sensed data during said sensing and wherein the step of generating includes generating said control signal from one of said first signal and said second signal and extracting a first data signal and a second data signal and the step of receiving is responsive to said control signal and at least one of said first data signal and said second data signal to derive therefrom a data signal containing the least amount of errors.

48. The method of claim 47 wherein the step of receiving further includes producing dynamic servo to improve alignment said first transducer having said at least two sensors relative to said predetermined storage locations concurrently with the extracting of a first data signal and a second data signal and the step of receiving is responsive to said control signal and at least one of said first data signal and said second data signal to derive therefrom a data signal containing the least amount of errors.

49. The method of claim 48 wherein the step of receiving includes the output device having an adjusting element operatively coupled to said at least two sensors for receiving and responding to information about the extent of errors in said control signal for adjusting said first transducer having at least two sensors in a direction to improve alignment of said at least two sensor with the predetermined storage locations

concurrently with the derivation of the data signal containing the least amount of errors from one of said at least two sensors.

50. The method of claim 43 wherein the step of generating further includes the steps of

comparing the extracted data signal containing at least one constraint with the expected data signal containing at least one restraint; and

generating in response thereto said control signal.

51. The method of claim 43 wherein the step of generating further includes the steps of

calculating using the extracted data signal containing at least one constraint the difference from the expected data signal containing at least one restraint; and

generating in response thereto said control signal.

52. The method of claim 43 wherein said predetermined storage locations are tracks on a rotating magnetic medium store and the stored data having at least one constraint are sensed by a magnetic transducer and wherein said servo system is operatively coupled to said magnetic transducer for receiving and responding to information about the extent of errors in said control signal for adjusting said magnetic transducer in a direction to position said transducer in alignment relative to said tracks on said rotating magnetic medium containing said predetermined storage locations.

53. A storage system comprising

a storage medium having located thereon predetermined storage locations having stored data containing at least one constraint;

a transducer positioned relative to said storage medium for sensing the data containing said at least one constraint stored in said predetermined storage locations and generating a first signal representative of said sensed data containing said at least one constraint and any errors introduced into the sensed data during said sensing;

an input device responsive to said first signal for generating a control signal containing information about the extent of errors in the sensed data and for extracting a data signal; and

an output device operatively coupled to said input device for receiving said control signal and for performing a control function in response thereto to improve the extracted data signal as a function of the extent of errors in the sensed data stored as data in said predetermined storage locations in said storage media.

54. The storage system of claim 53 wherein said transducer has at least two read elements and generates a first signal and a second signal each representative of said sensed data and any errors introduced into said sensed data during said sensing and wherein said input device is responsive to said first signal and said second signal to generate said control signal and for extracting a first data signal and a second data signal, said control function performing at least one of said output device being responsive to said control signal to produce a dynamic servo signal to improve alignment of the transducer relative to said predetermined storage locations in said storage media, and said output device extracting a first data signal and a second data signal and the step of receiving is responsive to said control signal and at least one of said first data signal and

said second data signal to derive therefrom a data signal containing the least amount of errors.

55. The storage system of claim 54 wherein said control function includes said output device being responsive to said control signal to produce a dynamic servo signal to improve alignment of said transducer having at least two read elements relative to said predetermined storage locations in said storage media and to concurrently extract a first data signal and a second data signal and the step of receiving is responsive to said control signal and at least one of said first data signal and said second data signal to derive therefrom a data signal containing the least amount of errors.

56. The storage system of claim 53 wherein the dynamic servo signal is used to improve alignment of the transducer relative to said predetermined storage locations in said storage media.

57. The storage system of claim 56 wherein said output device is responsive to said control signal to produce a dynamic servo signal in the form of a substantially continuous servo signal.

58. The storage system of claim 56 wherein said output device includes

an adjusting element for receiving and responding to information about the extent of errors in said control signal for adjusting said transducer in a direction to improve said transducer alignment relative to said predetermined storage locations in said storage media.

59. The storage system of claim 53 wherein said transducer is responsive to the data stored in said predetermined storage locations to generate a first signal having a data signal and an

error signal and wherein said error signal is used to generate said control signal.

60. The storage system of claim 53 wherein said transducer and said storage media are transported relative to each other and said control signal represents the current alignment from the desired alignment of the said transducer relative to said predetermined storage locations in said storage media enabling said adjusting element to adjust said transducer to position the same in a direction to improve alignment with said predetermined storage locations in said storage media.

61. A detection apparatus comprising

a first transducer being movably positioned for sensing stored data containing at least one constraint, said first transducer generating a first signal representative of sensed data containing at least one constraint stored as stored data and any errors introduced into the sensed data during said sensing;

a detector responsive to said first signal for producing a control signal containing information about the extent of errors in said sensed data and extracting a data signal; and

an output device operatively coupled to the detector for receiving said control signal and for performing a control function in response thereto to improve the extracted data from said stored data as a function of the extent of errors in the sensed data.

62. The detection apparatus of claim 61 wherein said output device is responsive to said control signal to produce a dynamic servo signal to improve alignment of said first transducer relative to said predetermined storage locations.

63. The detection apparatus of claim 61 wherein said output device includes

an adjusting element operatively coupled to said detector for receiving and responding to information about the extent of errors in said control signal for adjusting said transducer in a direction to improve said transducer alignment relative to said predetermined storage locations.

64. The detection apparatus of claim 61 wherein said transducer includes

at least two sensors for concurrently sensing said predetermined storage locations and generating a first signal and a second signal each representative of the data containing said at least one constraint from said predetermined storage locations and information about the extent of errors in the sensed data and wherein said output device is responsive to at least one of said first signal and said second signal to produce a control signal that is applied to such output device to derive the data signal containing the least amount of errors from one of said at least two sensors.

65. The detection apparatus of claim 64 wherein said output device is responsive to said control signal to produce a dynamic servo signal to improve alignment of said first transducer having at least two sensors relative to said predetermined storage locations concurrently with the derivation of a data signal containing the least amount of errors.

66. The detection apparatus of claim 61 wherein said transducer is a magnetic thin film transducer.

67. The detection apparatus of claim 61 wherein said transducer is a magnetoresistive element.

68. The detection apparatus of claim 67 wherein said transducer includes two magnetoresistive elements comprising a first sensor and a second sensor for generating a first sensor signal and a second sensor signal each of which is applied to said detector as said first signal.

69. The detection apparatus of claim 61 wherein the transducer is formed of a material utilizing spin-dependent scattering of electrons for sensing data stored at the predetermined storage locations.

70. The detection apparatus of claim 61 wherein said transducer is a giant magnetoresistive head.

71. The apparatus of claim 61 wherein said at least one constraint includes partial response maximum processing (PRML) encoding and wherein said control signal containing information about the extent of errors is derived during said PRML encoding of said first signal from observed samplings of said first signal and expected values of said observed samples as determined after maximum likelihood processing.

72. A method for using information about the extent of errors in combination with servo burst signals generated from prerecorded servo bursts comprising the steps of

positioning a first transducer for sensing prerecorded servo bursts and predetermined storage locations having stored data containing at least one constraint and generating in response to said prerecorded servo bursts servo burst signals and in response to the stored data a first signal representative of the data containing at least one constraint from said predetermined storage locations and any errors introduced into the sensed data during said sensing;

producing in response to the servo burst signals a position error signal;

generating in response to said first signal a control signal containing information about the extent of errors in said sensed data and extracting a data signal; and

receiving said position error signals and said control signal and adjusting with an adjusting element in the intervals between the servo burst signals the transducer in response to the position error signals to position the transducer in a designated alignment relative to said predetermined storage locations and performing in the intervals between the servo burst signals and in response to the control signal containing information about the extent of errors a control function to improve the extracted data signal as a function of the extent of errors.

73. The method of claim 72 wherein the step of positioning includes said transducer having at least two read elements that generate the servo burst signals and a first signal and a second signal each representative of said sensed data and any errors introduced into said sensed data during said sensing and wherein the step of receiving is responsive to said first signal and said second signal to generate said control signal and for extracting a first data signal and a second data signal, said control function between servo burst signals performing with an output device at least one of receiving said control signal for generating a dynamic servo signal to improve alignment of the transducer relative to said predetermined storage locations on said surface and being responsive to said control signal and at least one of said first data signal and said second data signal to derive therefrom a data signal containing the least amount of errors.

74. The method of claim 72 wherein the step of positioning includes the transducer being a magnetoresistive element.

75. Apparatus comprising

a first transducer for sensing stored data containing at least one constraint and prerecorded first servo burst data from a track on a first surface of a disc and producing from said first transducer a first signal representative of the stored data containing at least one constraint and any errors introduced into the sensed data during said sensing and first servo burst signals;

a second transducer for sensing stored data containing at least one constraint and prerecorded second servo burst data from a track on a second surface of a disc wherein an integrated relationship exists between the first surface and the second surface and producing from said second transducer a second signal representative of the stored data containing at least one constraint and any errors introduced into the sensed data during said sensing and second servo burst signals;

an input device responsive to said first signal and said second signal for generating in response to said first signal a first control signal containing information about the extent of errors in said sensed data and extracting a first data signal and generating in response to said second signal a second control signal containing information about the extent of errors in said sensed data and extracting a second data signal, said input device generating a first position error signal from said first servo burst signals and a second position error signal from said second servo burst signals; and

an output device responsive to said first servo burst signals and said second servo burst signals for adjusting with an

adjusting element in a closed servo loop the first transducer and second transducer in response to the position error signals and responsive to said first control signal and said second control signal for adjusting with said adjusting element during the intervals between each of said first servo burst signals and said second servo burst signals the first and second transducers in response to the information concerning the extent of errors in said first control signal and said second control signal.

76. The apparatus of claim 75 wherein said integrated relationship between said first surface and said second surface is that said surfaces are opposite surfaces on the same disc.

77. The apparatus of claim 73 wherein said integrated relationship between said first surface and said second surface is the said surface and surfaces on a different disc driven by a spindle.

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